



Distributed Energy Resources Chicago Industrial Energy Plan

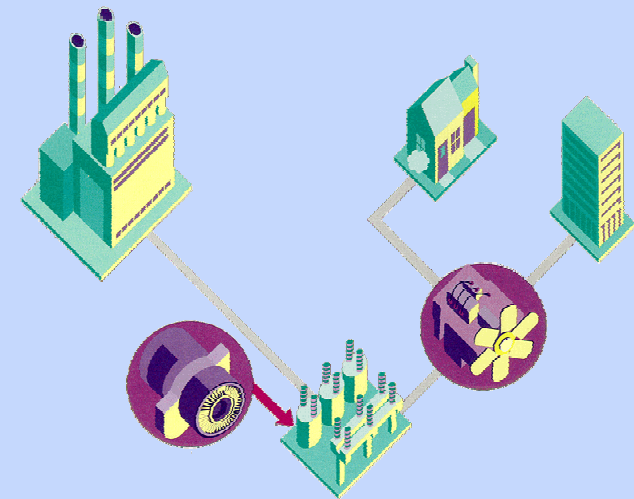
Gas Technology Institute

John F. Kelly, Director DER

Oak Ridge National Laboratory

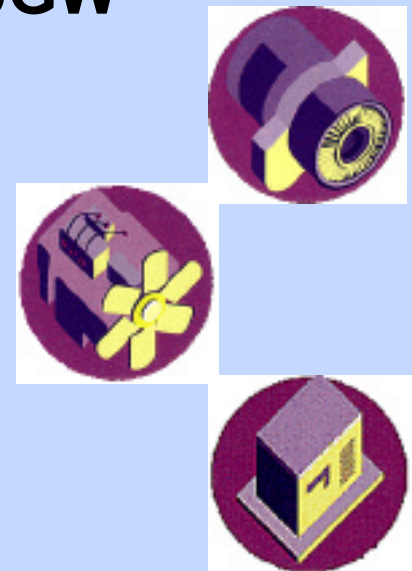
Tom Rizy, Technical Project Officer

January 30, 2002



Project Mission

- **Demonstrate Distributed Energy Resource's contribution to a Sustainable Urban Environment**
 - Lower Energy Costs and Improve Grid Utilization
 - Improve Air Quality (DER < 3- 4 lbs/MWh, NOx)
 - Increase Energy Efficiency
- **Contribute to DOE' s Goal to deploy 50GW**
- **Establish Technology Partnerships**
 - Department of Energy, ORNL, Manufacturers, Users, States, Cities, Gas and Energy Industry



Project Partnership

- **Project is being performed in partnership with the following organizations:**
 - **Gas Technology Institute**
 - **U.S. Department of Energy**
 - **Oak Ridge National Laboratory**
 - **City of Chicago, Department of Environment**
 - **University of Illinois at Chicago, Energy Resources Center**
 - **Ballard Engineering**

Strategic Goals

DOE DER Program

- 20% of Electric Growth
- Address Barriers
- Develop Advanced System Solutions

GTI Project

- Identify and exploit small scale DE Industrial market
- Reduce system costs via standard system design
- Demonstrate that DER can be deployed in a way that lowers overall industrial site emissions
- Demonstrate that DER can relieve constrained electric grid locations

Approach

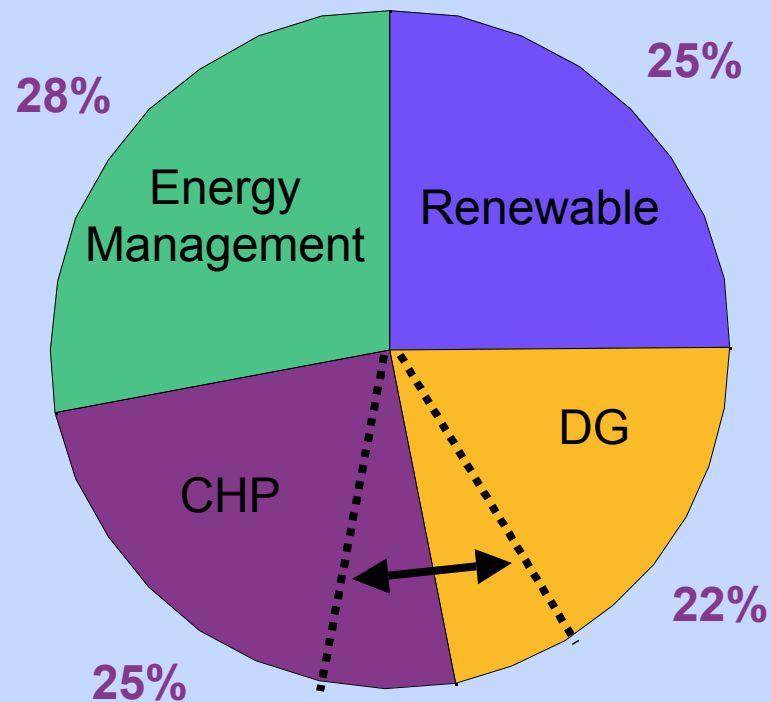
- **Develop standard program to maximize industrial DER in an urban setting**
 - Can be repeated in other cities
 - Relieve constrained grid areas
 - Reduce emissions from existing sources
- **Develop advanced DER systems for 5 to 10 sites**
 - Illinois DCCA Installation Support
 - Peoples Energy Installation Support
 - City of Chicago Installation Support
- **Provide Chicago with a plan for expanding this program to other areas**

Project Methods

- **Industrial Energy Plan (Complete)**
- **Site Characterization**
 - **Initial Characterization (Complete)**
 - Narrowed down to 20 possibilities
 - **Site Interviews (Underway)**
 - **Final Site Selections (Underway)**
- **Plant Evaluation/Data Gathering (Underway)**
- **DER Integration (Underway)**
 - **Expert Panel Meeting**
- **Final Report**
 - **System Designs**
 - **Urban Industrial Energy Plan Process**
 - **Grid Power Quality Effect**
 - **Industrial Energy Load Profiles**

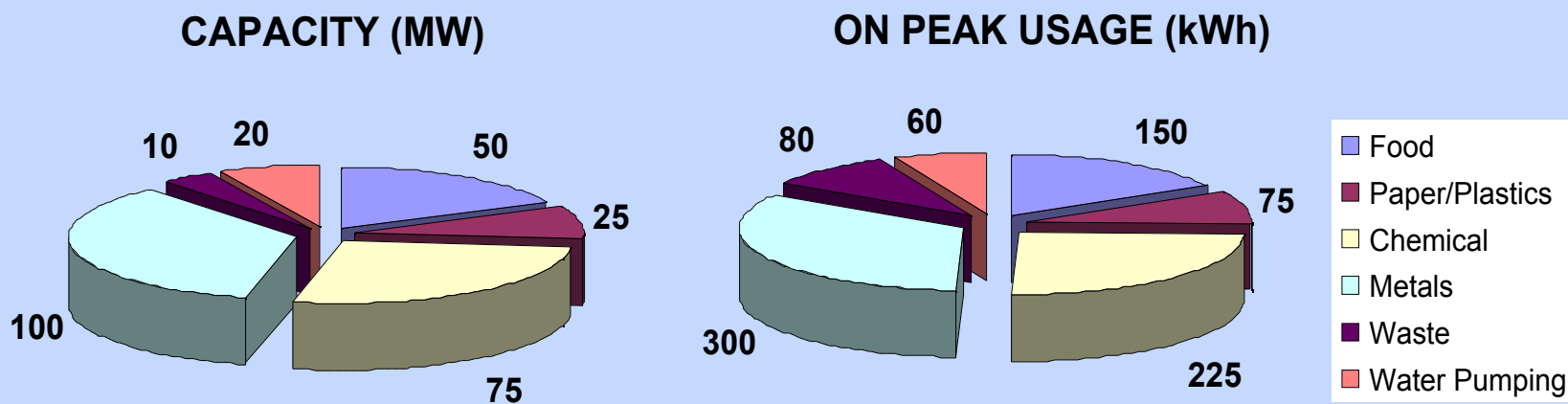
Results

- Chicago Energy Plan Goal – **6 Million kWh**
- Industrial Program to contribute 15% of goal



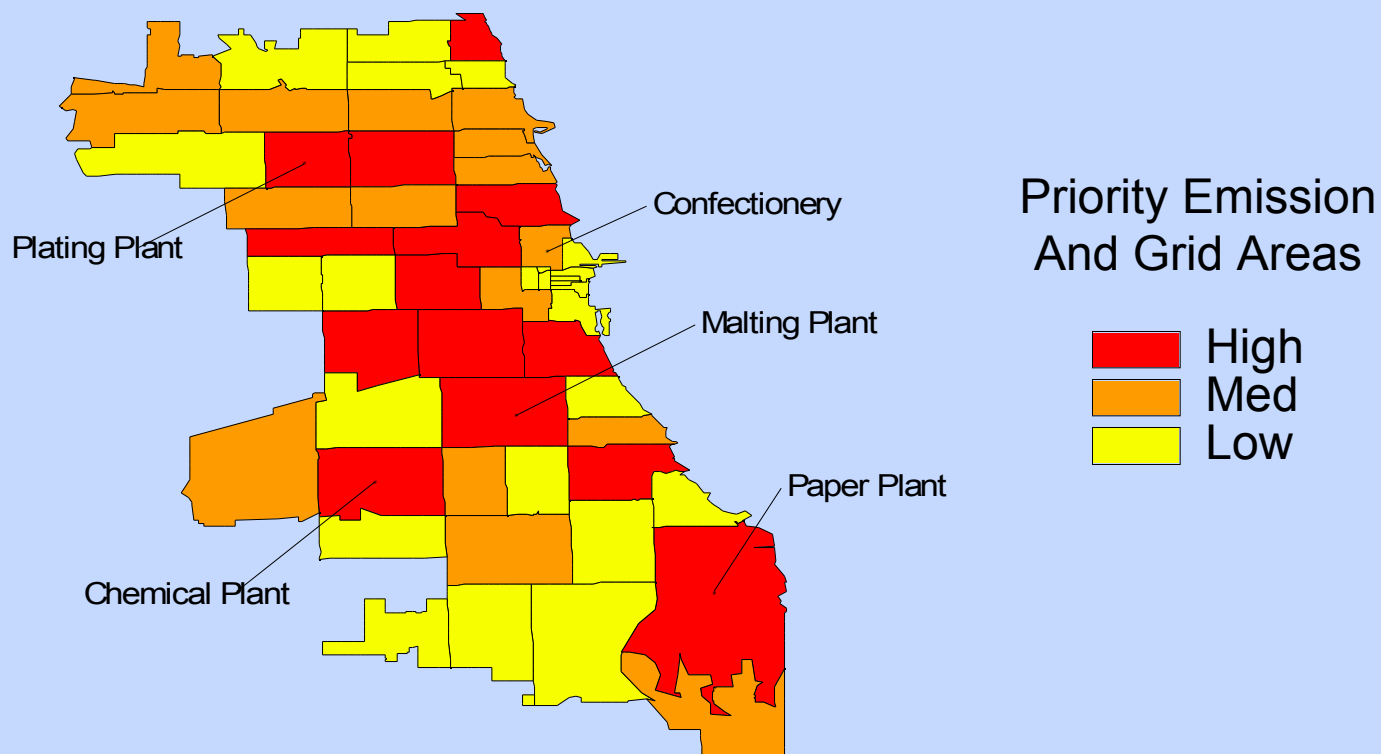
Reference: City of Chicago Mayor's Energy Plan

Potential Impact – Chicago Goal



Reference: Draft Chicago Industrial Energy Plan proposed objectives

Target Areas Identified



Reference: US and IL EPA Emissions data, proprietary grid information supplied by Chicago Department of Environment

50 Sites Identified Emissions/Energy/Grid

■ Food

Best Foods
Blommer
East Bait
Froedtert

Griffith
Jays
M&M Mars
Newly Weds

Nabisco
Peerless
Peer Foods
Real Sausage

Tootsie Roll
Vienna Beef
World' Finest
Wrigley

■ Chemical

Engineered Polymer

Grace Davison

Unichema

Valspar

■ Paper, Plastic

Chicago Tribune
Mead

Eaglebrook
Solo Cup

Holcim
Sun Times

■ Metal

Allied Metal
Amber Plating
ANC
APC

Edsal
Foote-Jones
Finkl
H. Kramer

Ingersoll
Jernberg
Joslyn
Orion

Phelps Dodge
Precoat
Ready Metals
Sipi Metals

Weyerhaeuser
Wheatland
White Cap
WR Grace

■ Waste

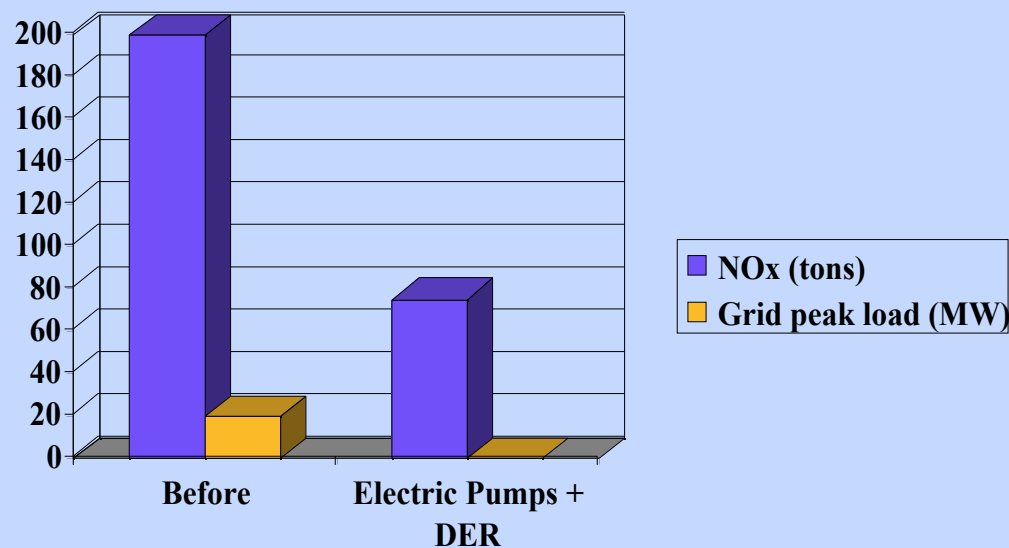
Clean Harbors

Water Reclamation District

Safety Kleen

Example Potential Site Water Pumping Stations

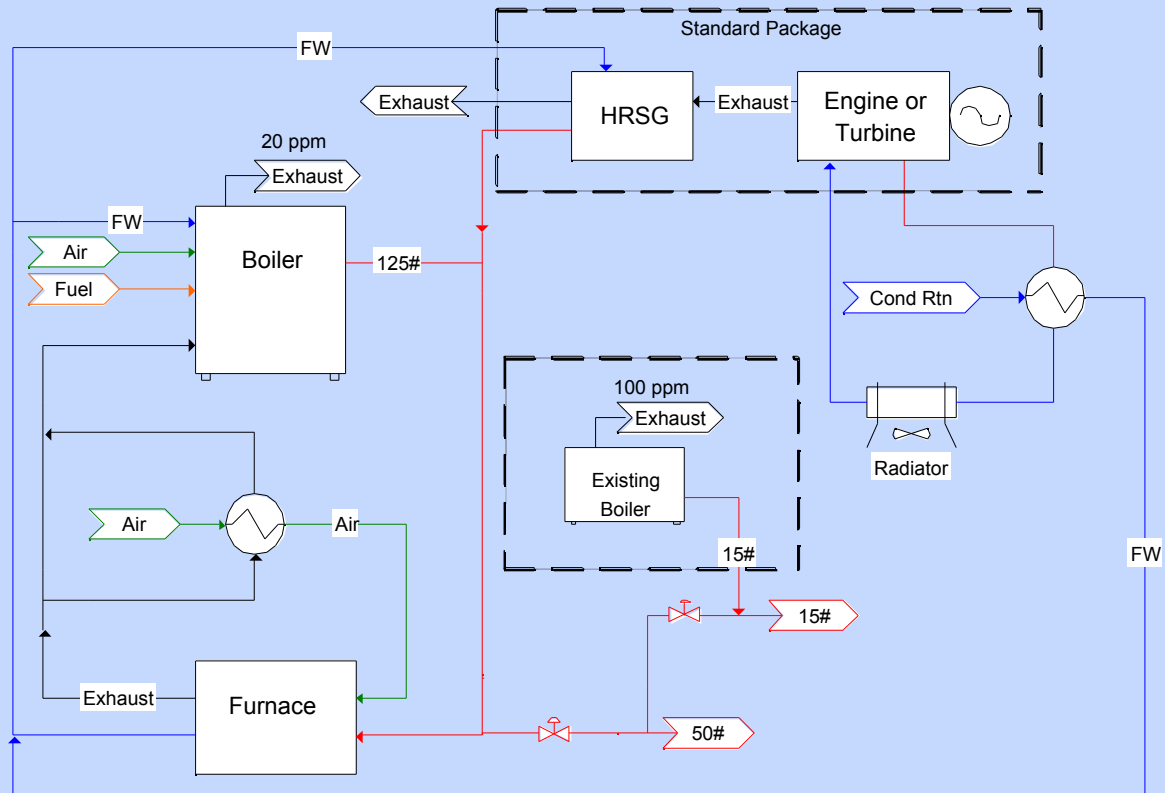
- **6 Municipal Water Pumping Stations**
 - Emissions – 200 tons NOx
 - Peak Power – 20 MW
- **Electric Pumps with DER Solution**
 - Eliminate 20 MW of new On Peak Grid Load



Next Project Actions

- **Finalize Characterization**
- **Begin Site Designs**
 - Confectionery - Food
 - Malting Operation – Food
 - Manufacturing - Paper
 - Petroleum Catalyst – Chemical
 - Plating Operation – Metals

Example Potential Site – Confectionery



- Site visits to quantify process interface
- Expert Panel to determine optimal solutions

Summary

■ Accomplishments

- Identified Significant Potential for
 - Reducing Consumer Energy Costs
 - Reducing Emissions
 - Relieving the Grid during On Peak Hours
- Identified Target SIC Industries for Technology Applications
- Initiating research to develop solutions

■ Future Actions

- Perform further research to close identified technology gaps and create solutions for a particular industry
- GTI expanding program to other cities